IPv6 Address Autoconfiguration

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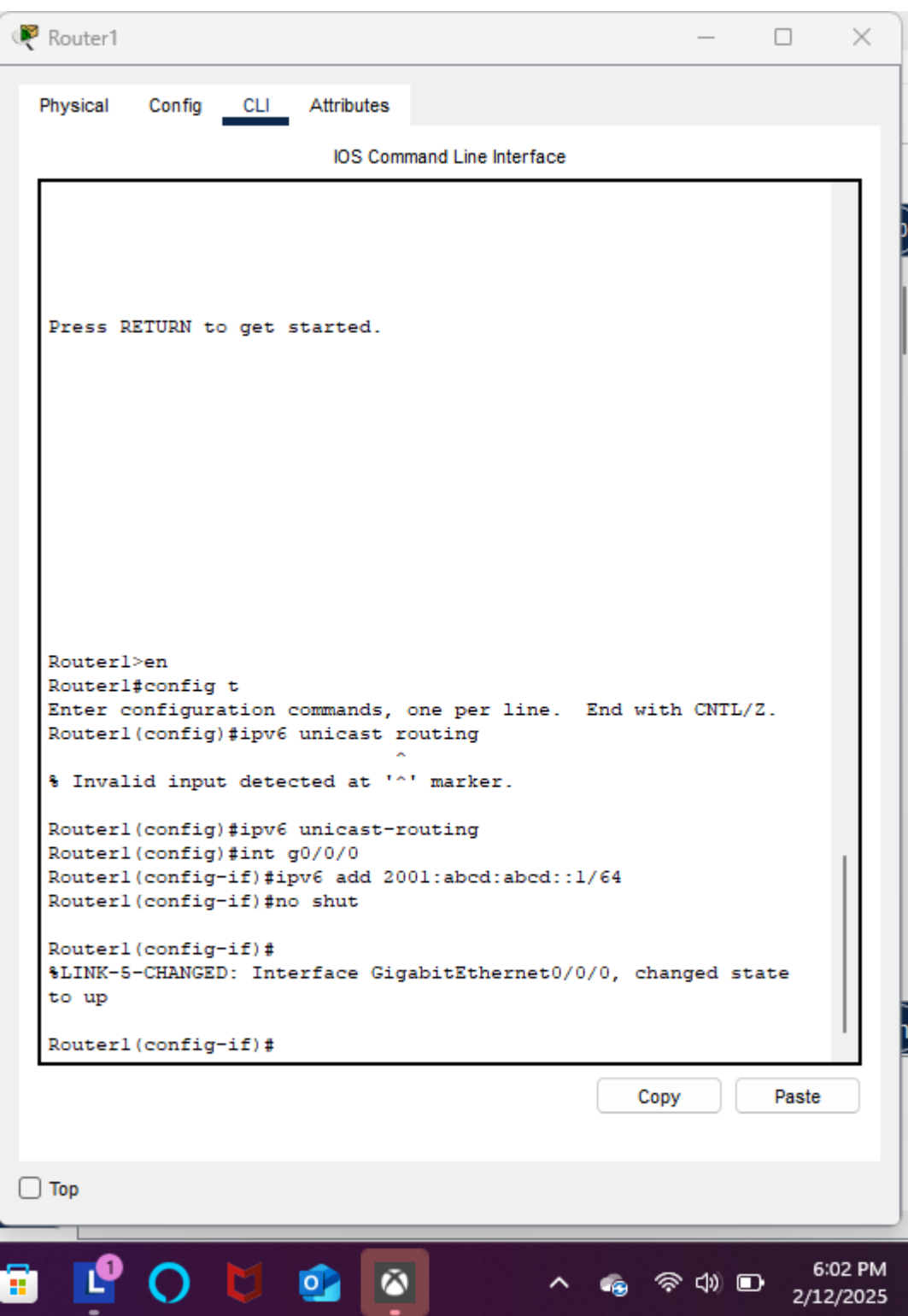ISR4331
Router1
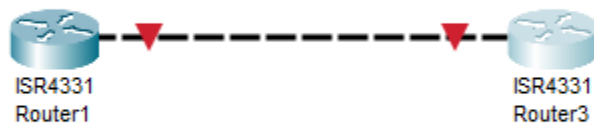
ISR4331
Router3

The objective of this setup is to configure IP addresses on the Ethernet interfaces of Router 1 and Router 3, as well as the loopback interface for Router 3, based on the provided network topology. For this setup, I utilized Cisco ISR4331 routers. The configuration involves assigning IP addresses to the Ethernet interfaces of Router 1 and Router 3, as illustrated in the topology. Additionally, I will configure the loopback interface for Router 3. Specifically, the G0/0/0 interface on Router 3 will use Stateless Address Autoconfiguration (SLAAC) to obtain the address prefix from Router 1. Meanwhile, Loopback0 will utilize Extended Unique Identifier (EUI)-64 to complete the host portion of the address. As a preliminary step, I have already configured the hostnames for both Router 1 and Router 3. With this foundation in place, I will proceed with the IP address configuration for the Ethernet and loopback interfaces.
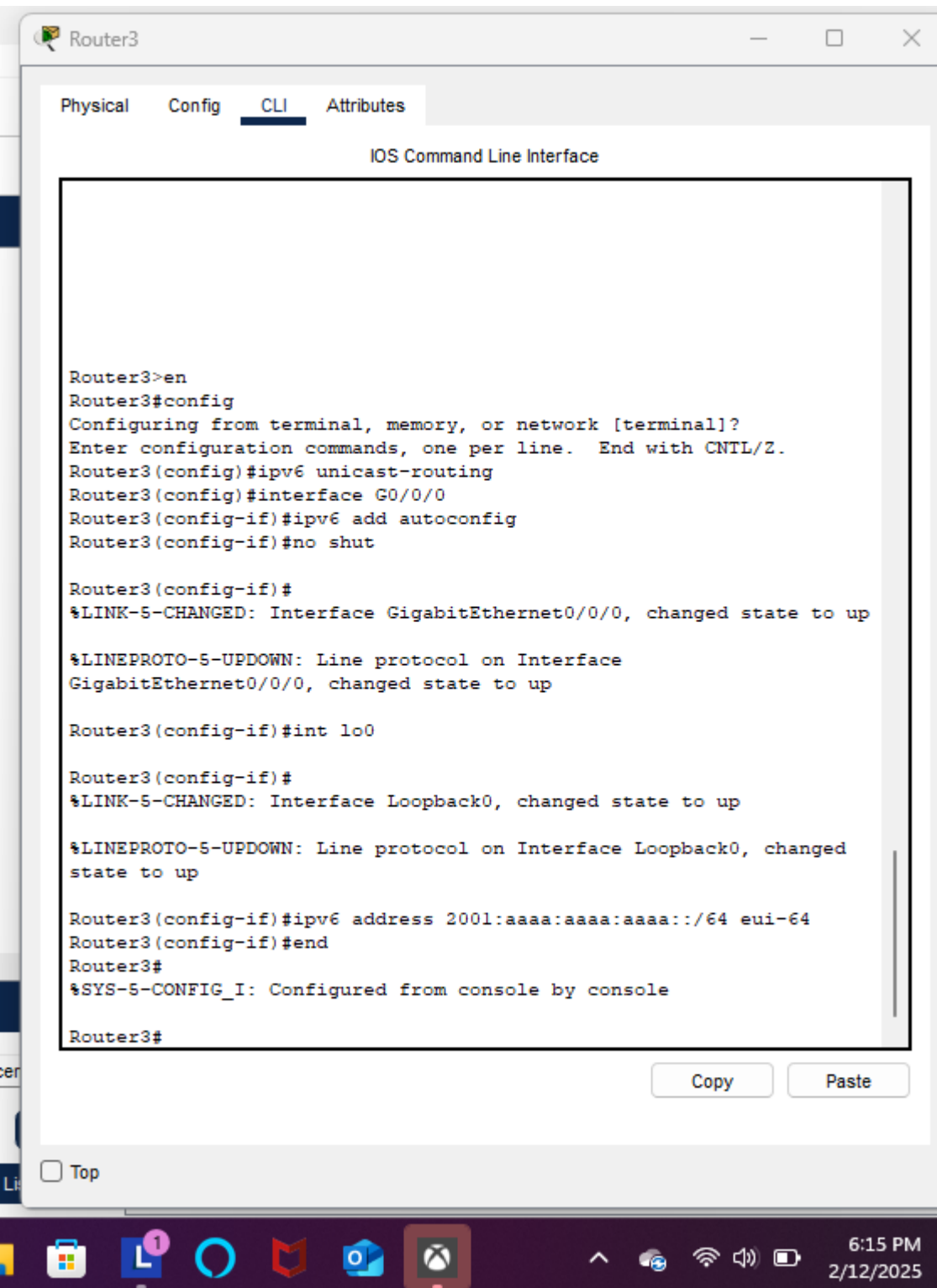
Router1 — □ ✕

Physical   Config   CLI   Attributes

IOS Command Line Interface

Press RETURN to get started.

Router1>en
Router1#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router1(config)#ipv6 unicast routing
                      ^
% Invalid input detected at '^' marker.

Router1(config)#ipv6 unicast-routing
Router1(config)#int g0/0/0
Router1(config-if)#ipv6 add 2001:abcd:abcd::1/64
Router1(config-if)#no shut

Router1(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0/0, changed state
to up

Router1(config-if)#

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To configure IPv6 addressing on the router, I began by enabling IPv6 unicast routing using the command R1(config)#ipv6 unicast-routing. This step allowed the router to forward IPv6 packets.

Next, I entered interface configuration mode for the G0/0/0 interface and assigned an IPv6 address of 2001:abcd:abcd::1/64 to the interface. I used the commands R1(config)#interface G0/0/0 and R1(config-if)#ipv6 address 2001:abcd:abcd::1/64 to complete this step.

Finally, I enabled the interface using command R1(config-if)#no shut. With these steps complete, I successfully configured IPv6 addressing on the router. Through this configuration, the router is now capable of forwarding IPv6 packets and communicating with other IPv6-enabled devices on the network.

Router3

Physical   Config   CLI   Attributes

IOS Command Line Interface

```
Router3>en
Router3#config
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line.  End with CNTL/Z.
Router3(config)#ipv6 unicast-routing
Router3(config)#interface G0/0/0
Router3(config-if)#ipv6 add autoconfig
Router3(config-if)#no shut

Router3(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface
GigabitEthernet0/0/0, changed state to up

Router3(config-if)#int lo0

Router3(config-if)#
%LINK-5-CHANGED: Interface Loopback0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback0, changed
state to up

Router3(config-if)#ipv6 address 2001:aaaa:aaaa:aaaa::/64 eui-64
Router3(config-if)#end
Router3#
%SYS-5-CONFIG_I: Configured from console by console

Router3#
```
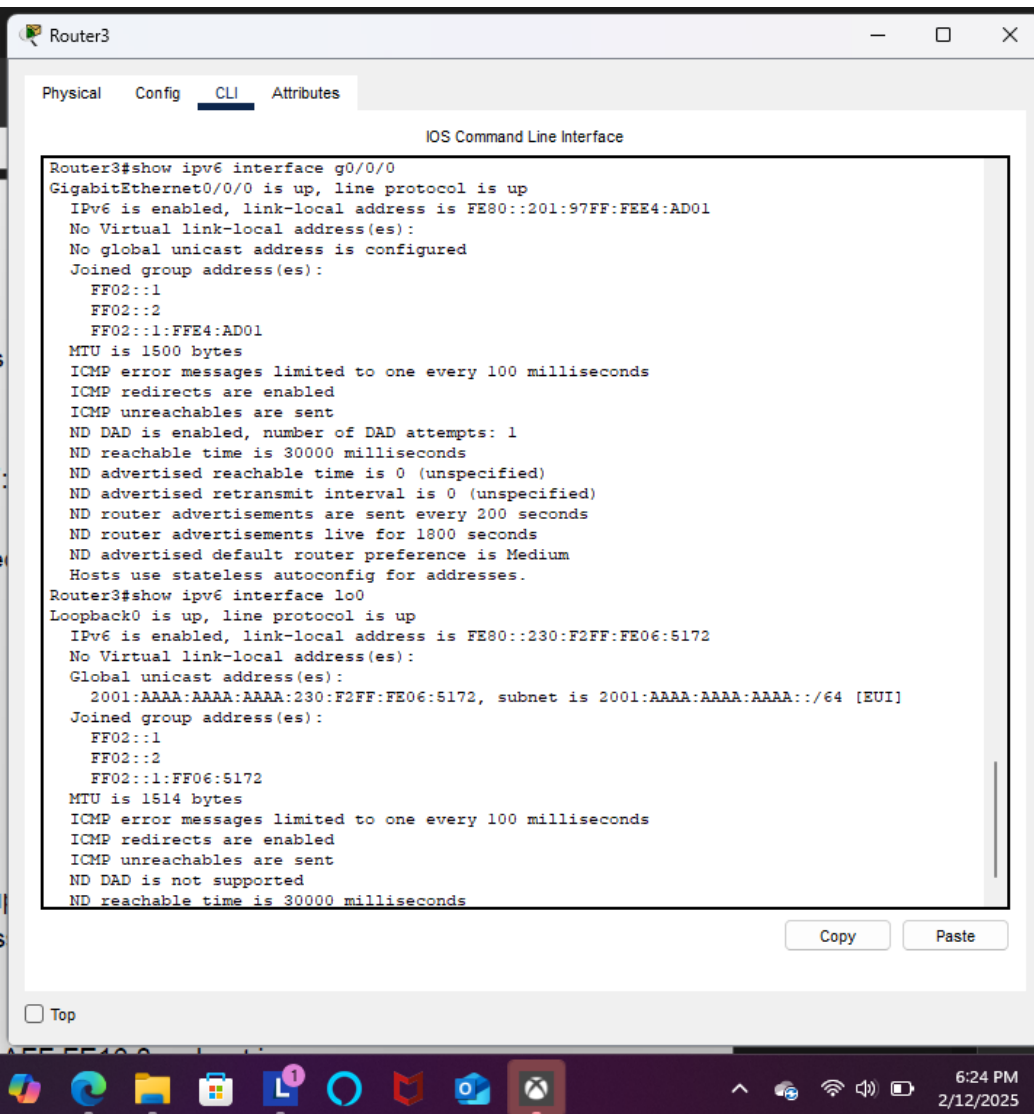
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To enable IPv6 routing on Router 3, I started by entering the command R3(config)#ipv6 unicast-routing. This command allowed the router to forward IPv6 packets.

Next, I configured the Gigabit Ethernet 0/0/0 interface to obtain its IPv6 address automatically. I entered the interface configuration mode using the command R3(config)#interface G0/0/0, and then used the command R3(config-if)#ipv6 address autoconfig to enable stateless autoconfiguration. Finally, I enabled the interface using the command R3(config-if)#no shut.

Additionally, I configured the Loopback 0 interface with a specific IPv6 address. I entered the interface configuration mode using the command R3(config)#interface lo0, and then assigned the IPv6 address 2001:aaaa:aaaa:aaaa::/64 using the command R3(config-if)#ipv6 address

2001:aaaa:aaaa:aaaa::/64 eui-64. The EUI-64 option was used to automatically generate the host portion of the IPv6 address.

To verify the configuration of Router 3, I used various show commands to check the status of the interfaces and their corresponding IP addresses.

```
Router3#show ipv6 interface g0/0/0
GigabitEthernet0/0/0 is up, line protocol is up
  IPv6 is enabled, link-local address is FE80::201:97FF:FEE4:AD01
  No Virtual link-local address(es):
  No global unicast address is configured
  Joined group address(es):
    FF02::1
    FF02::2
    FF02::1:FFE4:AD01
  MTU is 1500 bytes
  ICMP error messages limited to one every 100 milliseconds
  ICMP redirects are enabled
  ICMP unreachables are sent
  ND DAD is enabled, number of DAD attempts: 1
  ND reachable time is 30000 milliseconds
  ND advertised reachable time is 0 (unspecified)
  ND advertised retransmit interval is 0 (unspecified)
  ND router advertisements are sent every 200 seconds
  ND router advertisements live for 1800 seconds
  ND advertised default router preference is Medium
  Hosts use stateless autoconfig for addresses.
Router3#show ipv6 interface lo0
Loopback0 is up, line protocol is up
  IPv6 is enabled, link-local address is FE80::230:F2FF:FE06:5172
  No Virtual link-local address(es):
  Global unicast address(es):
    2001:AAAA:AAAA:AAAA:230:F2FF:FE06:5172, subnet is 2001:AAAA:AAAA:AAAA::/64 [EUI]
  Joined group address(es):
    FF02::1
    FF02::2
    FF02::1:FF06:5172
  MTU is 1514 bytes
  ICMP error messages limited to one every 100 milliseconds
  ICMP redirects are enabled
  ICMP unreachables are sent
  ND DAD is not supported
  ND reachable time is 30000 milliseconds
```

First, I used the command R3#show ipv6 int G0/0/0 to display the summary of the configured IP address on the Gigabit Ethernet 0/0/0 interface. This command also showed the status of the interface, indicating whether it was up, down, or administratively down. Additionally, the output included the subnet mask applied to the interface.

Next, I used the command R3#show ipv6 int lo0 to verify the configuration of the Loopback 0 interface. This command displayed the IP address and subnet mask configured on the loopback interface, as well as its status. By examining the output of these show commands, I was able to confirm that the interfaces were properly configured and functioning as expected.